ZUUM MEDIA®

Model: HE2BIR

Pro SERIES

HDMI over Two CAT5/6 Extender with Bi-Directional IR Control Path

User Manual

(HE2BIR-TX Front/Back)

(HE2BIR-RX Front/Back)

Full HD 1080 · HDMI · HDCP · 3D Compliant · x.v.Color · 7.1 CH AUDIO · RoHS Compliance · FC · CE · IR Remote Control Pass-through

Made in Taiwan
ZM 060112

SAFETY AND NOTICE

The **HE2BIR HDMI over Two CAT5/6 Extender with Bi-directional IR Control Path** has been tested for conformity to safety regulations and requirements, and has been certified for international use. However, like all electronic equipment, the HE2BIR should be used with care. Please read and follow the safety instructions to protect yourself from possible injury and to minimize the risk of damage to the unit.

- Follow all instructions and warnings marked on this unit.
- Do not attempt to service this unit yourself, except where explained in this manual.
- Provide proper ventilation, air circulation, and do not use near water.
- Keep objects that might damage the device away and assure that the placement of this unit is on a stable surface.
- Use only the power adapter, power cords, and connection cables designed for this unit.
- Do not use liquid or aerosol cleaners to clean this unit. Always unplug the power to the device before cleaning.

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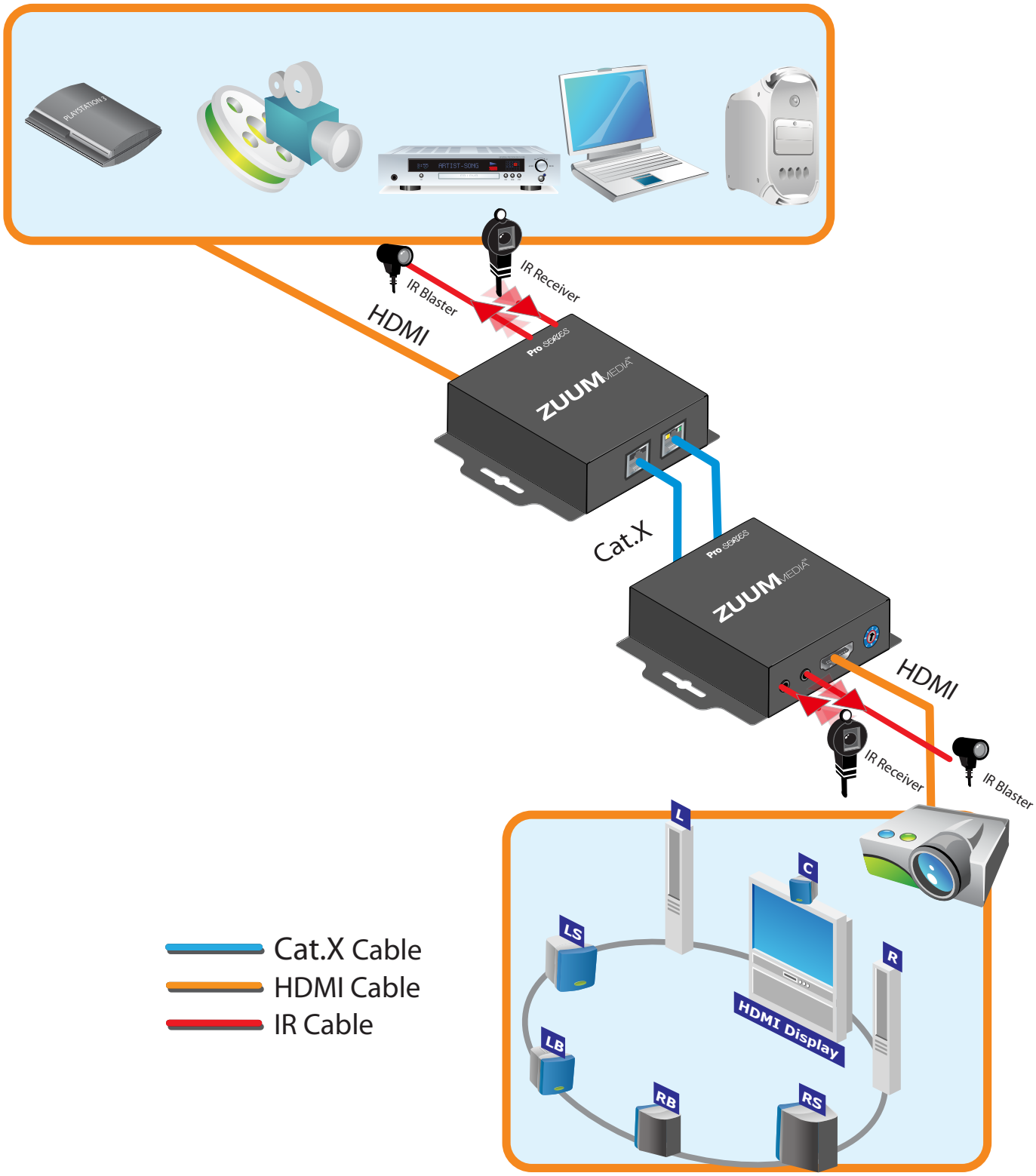
INTRODUCTION

The **HE2BIR HDMI over Two CAT5/6 Extender with Bi-directional IR** is 3D compatible, and boosts your HDMI transmission distance up to 60m (200ft) in HDTV 720p / 1080i format. With two low cost Cat-5/5e/6 cables, users can easily extend HDTV sources from DVD players, Blu-ray Disc player, PS3, PC, and any other kinds of sources compliant with TMDS. To distant display monitors including HDMI or DVI enabled TV sets, LCD PC monitors, or projectors. This cost effective solution makes HDCP compliant DVD players or other HDMI Sources that transmit high quality video and audio with a greater distance, when integrating several components apart. In addition, with the embedded infrared (IR) receiver and emitter ports to facilitate the control path, users can enjoy high quality audio/video and control the HDMI sources from the remote site instantly.

The HE2BIR includes two units: HE2BIR-TX transmitter unit and HE2BIR-RX receiving unit. The transmitter unit is used to transfer the HDMI or DVI and IR signal input through two RJ45 connectors and over two low cost Cat-5/5e/6 cables. The receiving unit is responsible for equalizing transferred TMDS multimedia data and re-sending IR signals. The transmission distance between the sending and receiving units can be up to 60m (200ft) under HD (720p/1080i) or up to 40m (130ft) under Full HD resolution (1080p). With an 8-level equalization rotary control knob on the receiver unit, users can adjust the equalization strength of the received TMDS signals accordingly, and therefore optimize the transmission distance between source and destination.

APPLICATION



SPECIFICATIONS & PACKAGE CONTENTS

Model Name		**HE2BIR**	
Technical		HE2BIR-TX	HE2BIR-RX
Role of usage		Transmitter [TX]	Receiver [RX]
HDMI compliance		Yes	
HDCP compliance		Yes	
Video bandwidth		Single-link 225MHz [6.75Gbps]	
Video support		480i / 480p / 720p / 1080i / 1080p60	
HDMI over UTP transmission [8-bit]		Full HD (1080p)-40m (130ft) [CAT5e] / 50m (165ft) [CAT6] HD (720p/1080i)-50m (165ft) [CAT5e] / 60m (200ft) [CAT6]	
Audio support		Surround sound (up to 7.1ch) or stereo digital audio	
Equalization		8-level digital control at RX	
Input TMDS signal		1.2 Volts [peak-to-peak]	
Input DDC signal		5 Volts [peak-to-peak, TTL]	
ESD protection		[1] Human body model — ±19kV [air-gap discharge] & ±12kV [contact discharge] [2] Core chipset — ±8kV	
PCB stack-up		4-layer board [impedance control — differential 100Ω; single 50Ω]	
Input		1x HDMI + 2x 3.5mm	2x RJ-45 + 1x 2.1mm
Output		2x RJ-45 + 1x 2.1mm	2x HDMI + 1x 3.5mm
HDMI source control		Controllable via bi-directional IR pass-through path	
IR remote control		Electro-optical characteristics: π = 25° / Carrier frequency: 20-60kHz	
HDMI connector		Type A [19-pin female]	
RJ45 connector		WE/SS 8P8C with 2 LED indicators	
3.5mm connector		IR blaster or receiver	
Rotary switch		None	Signal level EQ
Mechanical		HE2BIR	
Housing		Metal enclosure	
Dimensions [L x W x H]	Model	60 x 93 x 25mm (2.4 x 3.7 x 1)	
	Package	175 x 270 x 80mm (6.9 x 10.6 x 3.1)	
Weight	Model	405g (14oz)	
	Package	815g (1.8 lbs)	
Power supply		5V DC at either TX or RX (phantom power)	
Power consumption		1.5 Watt (max)	
Operation temperature		0~40°C [32~104°F]	
Storage temperature		-20~60°C [-4~140°F]	
Relative humidity		20~90% RH [no condensation]	
Package Contents		1x HE2BIR [TX & RX] 1x IR blaster 1x IR receiver 1x 5V DC power supply unit 1x User manual	

FEATURES

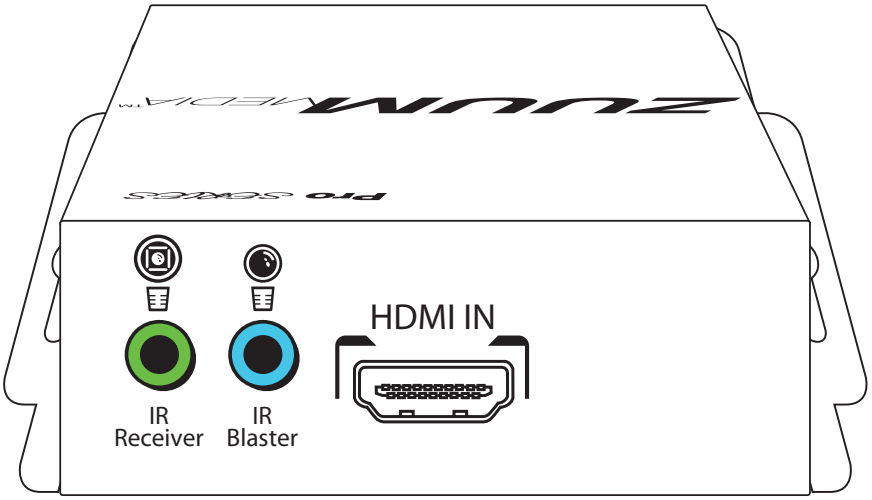
- Full HD and 3D compliant
- Extends the transmission distance up to 60m (200ft) from the sources under 1080i or 720p
- Extends the transmission distance up to 40m (130ft) from the sources under 1080p
- Provides independent DDC channel, fully HDCP compliant
- Minimizes the cable skew by adjustable 8-level equalization control
- Supports bi-directional full frequency of IR signal, 20kHz ~ 60kHz
- Pure unaltered uncompressed 7.1ch digital HDMI over Cat-5/5e/6 cable transmission
- Wall mount housing design for easy and robust installation
- Only needs power supply at either TX or RX unit
- Perfectly integrated with other HDMI over CAT5/6 series products

The length depends on the characteristics and quality of the cables. Higher resolutions and longer transmission distances require low skew cables (<25ns/100m) for best performance. Shielded CAT6 with shielded RJ45 connectors is recommended.

PANEL DESCRIPTIONS

HE2BIR-TX (Transmitter)

Input Panel

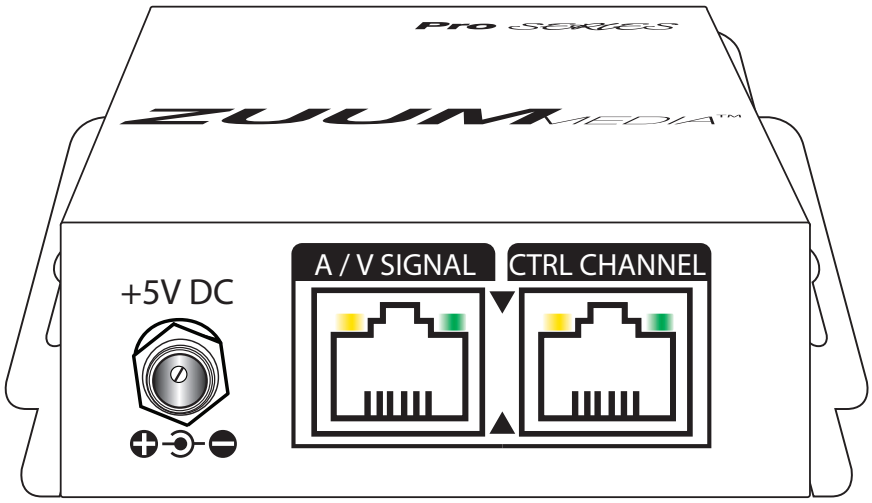


IR RECEIVER: 3.5mm infrared socket for plugging in the extension cable of IR receiver

IR Blaster: 3.5mm infrared socket for plugging in the extension cable of IR blaster

HDMI IN: Connects to a HDMI source with a HDMI male-male cable

Output Panel



+5V DC: Connect to 5V DC power supply unit either at the Transmitting Unit or the Receiving Unit. Powered at one end is enough to supply the whole extender set.

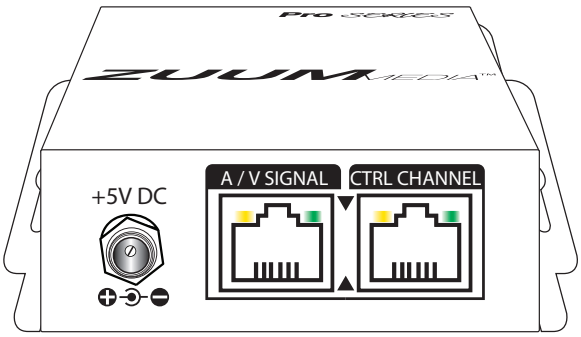
A/V SIGNAL: Connect to the **A/V SIGNAL** port on the receiving unit with a Cat-5/5e/6 cable.

CTRL CHANNEL: Connect to the **CTRL CHANNEL** port on the receiving unit with a Cat-5/5e/6 cable.

PANEL DESCRIPTIONS CONTINUED

HE2BIR-RX (Receiver)

Input Panel



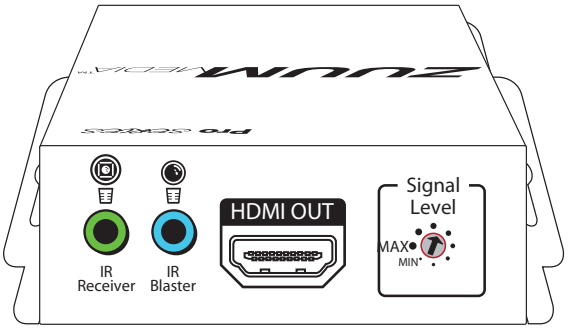
+5V DC: Connect to a 5V DC power supply unit either at the Receiving Unit or the Transmitting Unit. Powered at one end is enough to supply the whole extender set.

A/V SIGNAL: Connect to the **A/V SIGNAL** port on the transmitting unit with a Cat-5/5e/6 cable.

CTRL CHANNEL: Connect to the **CTRL CHANNEL** port on the transmitting unit with a Cat-5/5e/6 cable.

Note: In limited space applications a special USB Power cable can be used (Sold Separately) **Model: 2USB135L** will pull USB Power from USB on TV instead of using enclosed power supply. This cable can also help with some electrical interference, the types that can cause HDMI sync loss.

Output Panel



IR Receiver: 3.5mm infrared socket for plugging in the extension cable of IR receiver.

IR Blaster: 3.5mm infrared socket for plugging in the extension cable of IR blaster.

HDMI OUT: Connects to a HDMI display with a HDMI male-male cable.

Signal Level: Adjust the 8-level signal level equalization control to the received HDMI signals. The HDMI signal level varies from 0 (strongest) to 7 (weakest) for respective transmission length from longest possible range to short distance. Dial the Signal Level from 7 to 0 and stop turning the rotary switch whenever the audio/video is playing normally. Inappropriate signal level setting may cause overpowering issues that would shorten the product's life significantly!

HARDWARE INSTALLATION

1. Connect your video source (such as a Blu-ray Disc player) to the transmitting unit HE2BIR-TX.
2. Connect the IR blaster to the transmitting unit HE2BIR-TX, and make the IR blaster directly point to the IR sensor of the HDMI source device(s).
3. Connect a display (such as a LCD or plasma HDTV) to the receiving unit HE2BIR-RX.
4. Connect the IR receiver to the receiving unit HE2BIR-RX, and make the IR receiver directly point to the user.
5. Connect two Cat-5/5e/6 cables between the transmitting and receiving units via **A/V SIGNAL** and **CTRL CHANNEL** ports respectively.
6. Make sure these two Cat-5/5e/6 cables are tightly connected and not loose.
7. Plug in 5V DC power supply unit to the power jack of the receiving unit HE2IBR-RX, or use USB Power Cable **Model: 2USB135L (Sold Separately)**
8. If you see flickering or blinking image on the display, adjust the rotary control **Signal Level** on the receiving unit to improve the cable skew. 0 stands for the strongest HDMI signal level for longest possible transmission length while 7 stands for the weakest HDMI signal level for short transmission length. Try adjusting the signal level from 7 to 0 to find the optimal setting for the HDMI over CAT5/6 transmission.

IR CONTROL PATH

IR Extenders

IR Blaster

IR Receiver

IR SOCKETS

HE2BIR-TX

IR Blaster: Plug in the IR blaster cable here to transmit all IR command signals received from the IR receiver to control the HDMI source devices.

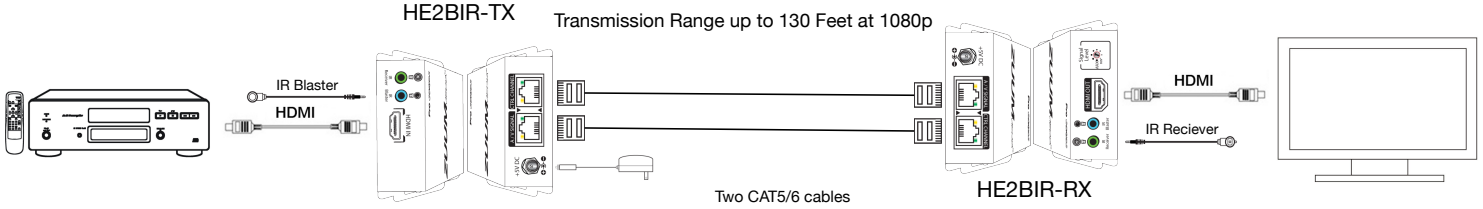
HE2BIR-RX

IR Receiver: Plug in the IR receiver here to receive all IR command signals from the IR remote controls of the HDMI source devices

IR NOTES

Basic IR Set Up Diagram

- In this diagram the IR blaster is plugged into the Blaster port of the HE2BIR transmitter. When using blaster the output is higher than normal compared to a emitter. Do not place IR blaster directly onto source equipment such as a Blu-Ray player IR receiving window. The stronger signal can over saturate the IR receiver window on the device and cause unstable or non working performance. Place the blaster a few inches away from source equipment or bounce IR off a cabinet etc. Test IR blaster location for best performance before mounting. Plug the IR Receiver (It is larger than the blaster) into the IR Receiver port of the HE2BIR receiver. Mount IR receiver in a location that will receive IR from the remote line of sight or install receiver slightly behind bottom of TV for a bounced IR effect. Please note some TV's can interfere with the IR Receiver. It may be best to test IR Receiver away from the TV if intermittent problems are being experienced to determine final location or use CFL friendly type IR Receiver.



IR NOTES CONTINUED

IR Diagram Using 3rd Party RF Controller

- In this example you are using a RF remote that is communicating back to an RF base station that then outputs IR signal to equipment and through the HE2BIR transmitter and receiver to control TV. The IR blaster will plug into the HE1BIR Receiver by the TV location do not place the IR Blaster directly on the TVs IR Receiving window but a few inches away to avoid saturation. A 3rd party IR Emitter can be used but please do not change pin out to avoid damage. Not all emitters are compatible.

From the IR output of your RF receiving base station use our Model: 35M35MIR cable to plug from that output to the HE2BIR transmitter IR Receiving input.

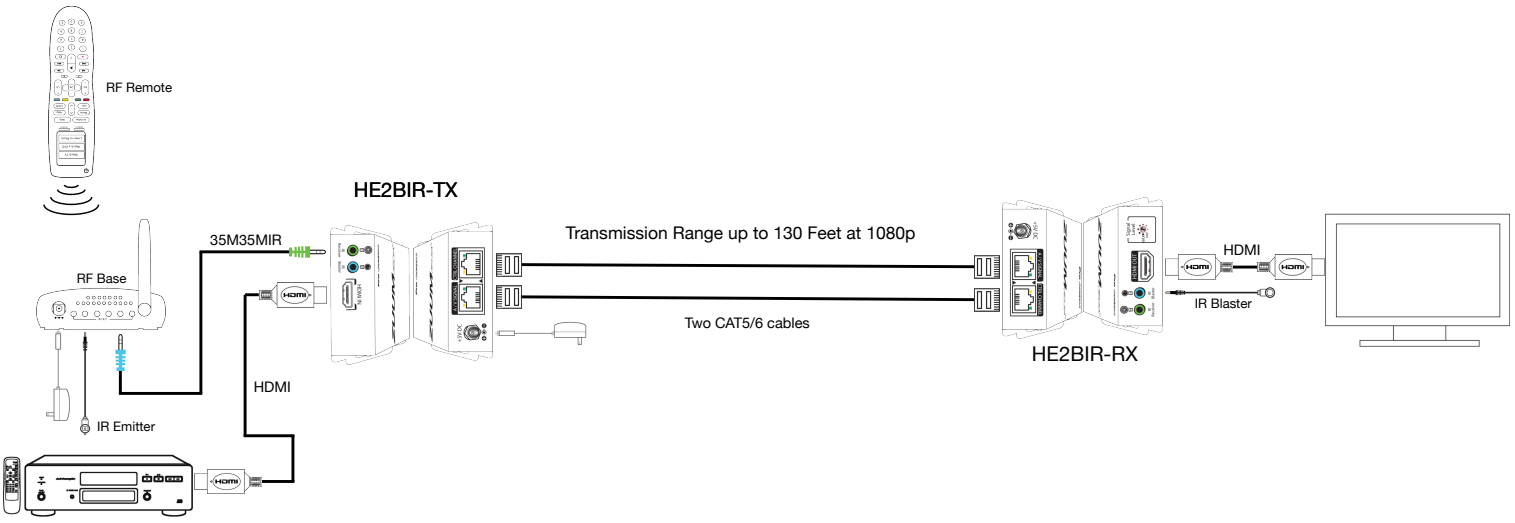
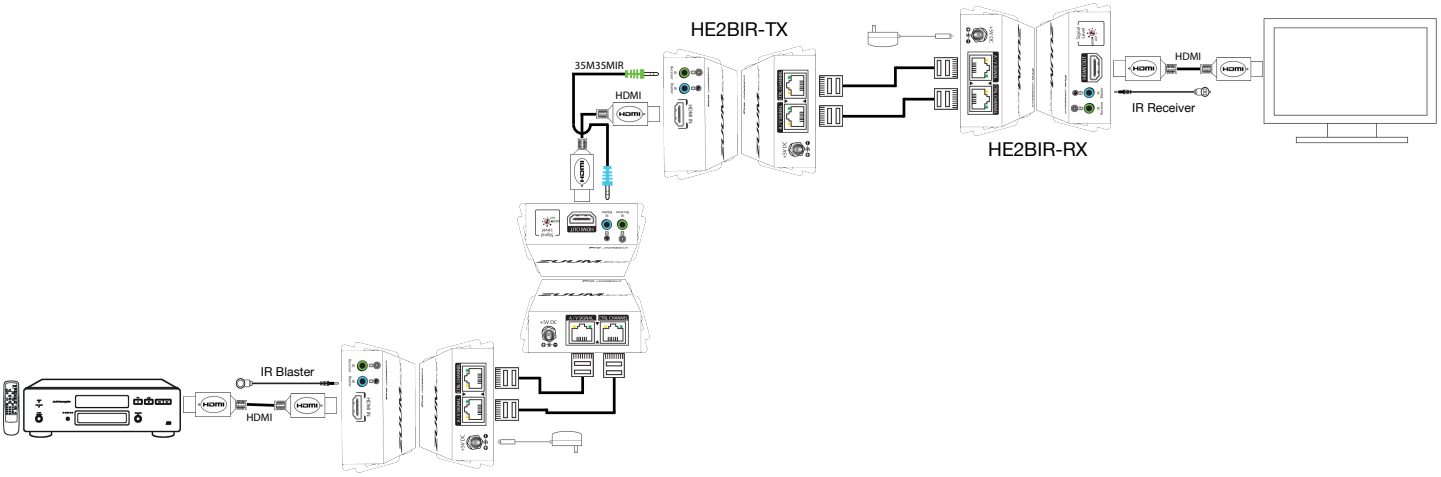


Diagram Using Two HE2BIR's Daisy Chained

- In this example to increase distance you can use two sets of HE2BIR's as shown in the diagram. Note to pass the IR correctly on the middle HE2BIR transmitter and receiver you can simply point IR Receiver and IR blaster to each other to extend IR signal. A plug and play way is to use our Model: 35M35MIR cable. See diagram for details of connection.



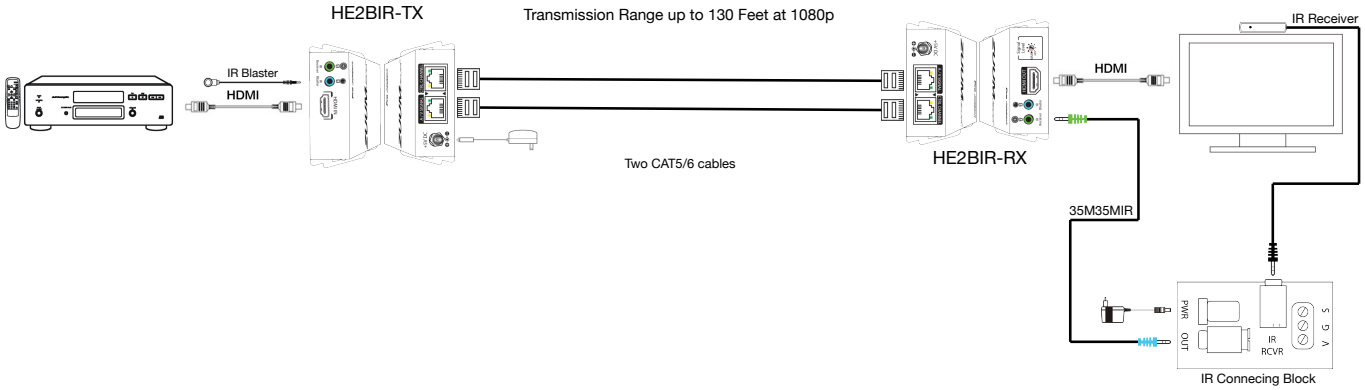
IR NOTES CONTINUED

Diagram Using 3rd Party IR Equipment

- In this example you may need to use a CFL friendly IR receiver or simply want a specific IR receiver style based on your installation application.

Use the 3rd party IR receiver with there connecting block and power supply. Connect the IR output of that block to our Model: 35M35MIR cable then plug into the Green IR Receiving input of the HE2BIR Receiver. Use the IR Blaster or compatible IR emitter plugged into the blaster port of the HE2BIR Transmitter for source control.

NOTE: This layout is generally best instead of plugging 3rd party IR Receiver directly into HE1BIR Receiver. The HE1BIR Receiver is based on a 5 volt system and some IR Receivers are 12 volts. Also some IR Receivers are not pinned the same as the HE2BIR IR Receiver included with kit.



IR Trouble Shooting Check Points(Video Working)

(IR Not Working At All)

- Reference IR Diagrams (1-4)
- For basic IR set up applications (See Diagram # For Reference) make sure smaller size IRBlaster is plugged into the Blaster port of the HE2BIR Transmitter.
- If using IR Blaster do not place directly over equipment IR receiving window. This may over saturate the equipment (source) IR window and cause instability or not even work at all.
- For basic IR set up applications make sure larger IR Receiver is plugged into HE2BIR Receiver.
- Move IR Receiver away for TV and test to see if TV is causing to much interference and locking up IR Receiver. If so use CFL friendly type IR Receiver.
- Disconnect HDMI cables from the HE2BIR Transmitter and Receiver. See if this corrects problem. If so then there may be a problem with interference for example from a cable box or satellite receiver coaxial input.

IR NOTES CONTINUED

IR Trouble Shooting Check Points(Video Working)

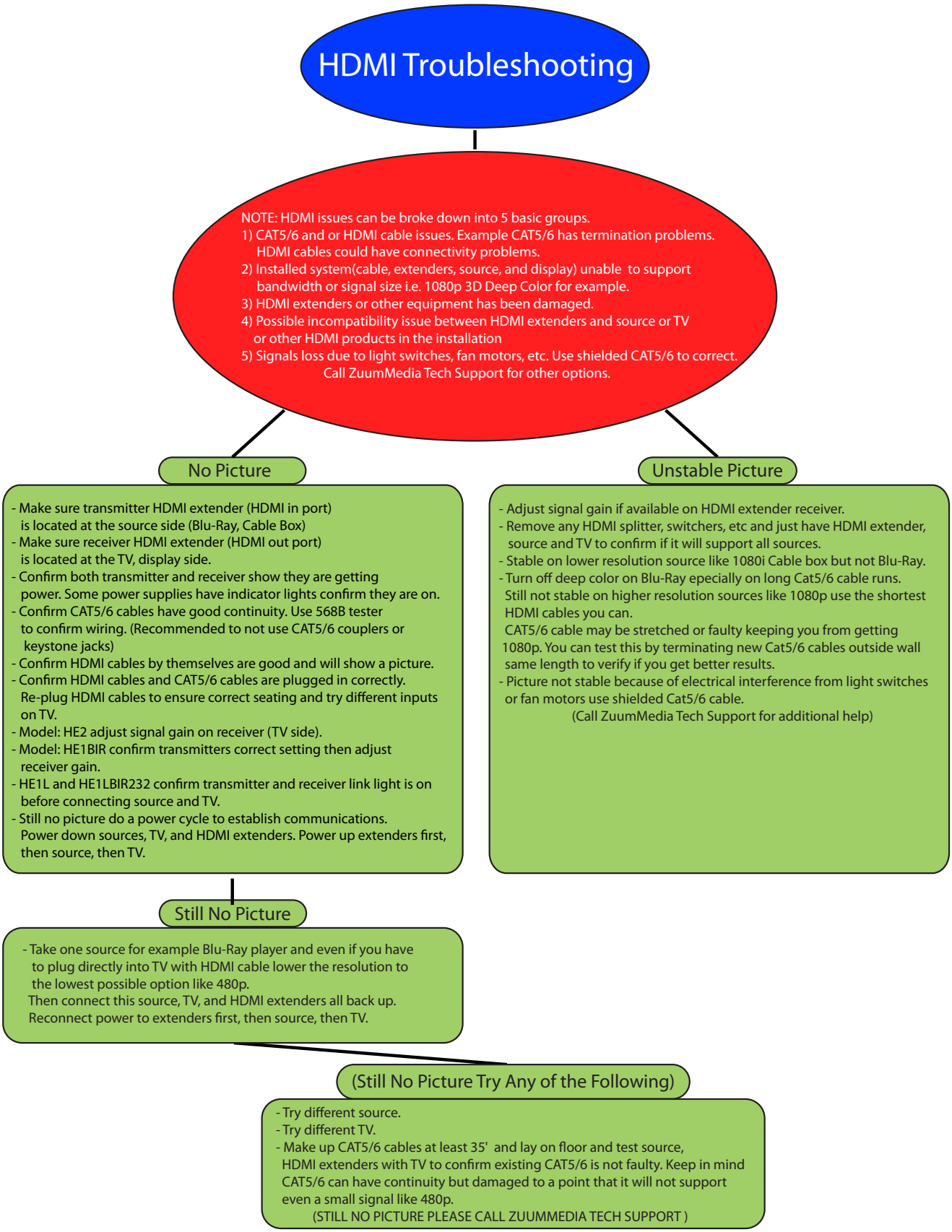
(IR Works Intermittently)

- Make sure IR Blaster is not placed directly over equipment IR Receiving window. Move IR Blaster in different places in equipment cabinet until stable performance. Usually pointing IR blaster a few inches away from equipment is good.
- Make sure IR from remote is not able to send IR code to IR Receiver and indirectly to some of the source equipment.
- If there too much outside light effecting the IR Receiver like in a outdoor patio installation. Control outside light and test to confirm ambient light is not causing the instability.

SUPPORTED IR DATA FORMAT

Data Format	Suitable	Not Recommended
NEC	✓	
RC5	✓	
TOSHIBA MICOM CODE	✓	
GRUNDIG CODE	✓	
SONY 12 BIT CODE	✓	
SONY 15 BIT CODE	✓	
SONY 20 BIT CODE	✓	
RCA CODE		✓
RCM CODE		✓
MATSUSHITA CODE		✓
MITSUBISHI CODE	✓	
ZENITH CODE	✓	
JVC CODE	✓	
M50560-001P	✓	
MN6125H	✓	
MN6125L	✓	
MN6014_C5D7	✓	
MN6014-C6D6	✓	
MC14457P	✓	
LC7464(AHEA)	✓	
GEMINI_CM	✓	

HDMI TROUBLESHOOTING


HDMI Troubleshooting
NOTE: HDMI issues can be broke down into 5 basic groups.
1) CAT5/6 and or HDMI cable issues. Example CAT5/6 has termination problems. HDMI cables could have connectivity problems.
2) Installed system(cable, extenders, source, and display) unable to support bandwidth or signal size i.e. 1080p 3D Deep Color for example.
3) HDMI extenders or other equipment has been damaged.
4) Possible incompatibility issue between HDMI extenders and source or TV or other HDMI products in the installation
5) Signals loss due to light switches, fan motors, etc. Use shielded CAT5/6 to correct.
Call ZuumMedia Tech Support for other options.
No Picture
- Make sure transmitter HDMI extender (HDMI in port) is located at the source side (Blu-Ray, Cable Box)
- Make sure receiver HDMI extender (HDMI out port) is located at the TV, display side.
- Confirm both transmitter and receiver show they are getting power. Some power supplies have indicator lights confirm they are on.
- Confirm CAT5/6 cables have good continuity. Use 568B tester to confirm wiring. (Recommended to not use CAT5/6 couplers or keystone jacks)
- Confirm HDMI cables by themselves are good and will show a picture.
- Confirm HDMI cables and CAT5/6 cables are plugged in correctly. Re-plug HDMI cables to ensure correct seating and try different inputs on TV.
- Model: HE2 adjust signal gain on receiver (TV side).
- Model: HE1BIR confirm transmitters correct setting then adjust receiver gain.
- HE1L and HE1LBIR232 confirm transmitter and receiver link light is on before connecting source and TV.
- Still no picture do a power cycle to establish communications. Power down sources, TV, and HDMI extenders. Power up extenders first, then source, then TV.
Unstable Picture
- Adjust signal gain if available on HDMI extender receiver.
- Remove any HDMI splitter, switchers, etc and just have HDMI extender, source and TV to confirm if it will support all sources.
- Stable on lower resolution source like 1080i Cable box but not Blu-Ray.
- Turn off deep color on Blu-Ray epecially on long Cat5/6 cable runs. Still not stable on higher resolution sources like 1080p use the shortest HDMI cables you can. CAT5/6 cable may be stretched or faulty keeping you from getting 1080p. You can test this by terminating new Cat5/6 cables outside wall same length to verify if you get better results.
- Picture not stable because of electrical interference from light switches or fan motors use shielded Cat5/6 cable.
(Call ZuumMedia Tech Support for additional help)
Still No Picture
- Take one source for example Blu-Ray player and even if you have to plug directly into TV with HDMI cable lower the resolution to the lowest possible option like 480p. Then connect this source, TV, and HDMI extenders all back up. Reconnect power to extenders first, then source, then TV.
(Still No Picture Try Any of the Following)
- Try different source.
- Try different TV.
- Make up CAT5/6 cables at least 35' and lay on floor and test source, HDMI extenders with TV to confirm existing CAT5/6 is not faulty. Keep in mind CAT5/6 can have continuity but damaged to a point that it will not support even a small signal like 480p.
(STILL NO PICTURE PLEASE CALL ZUUMMEDIA TECH SUPPORT)

NOTICE

1. Adjust the 8-level signal level equalization control to the received HDMI signals. Dial the **Signal Level** from 7 to 0 and stop turning the rotary switch whenever the audio/video is playing normally. Inappropriate signal level setting may cause overpowering issues that would shorten the product's life significantly!
2. Inserting IR blaster and IR receiver to wrong 3.5mm infrared sockets may result in a failure of the IR extenders. Please check carefully and plug blaster and receiver into its marked location.
3. If the DVI or HDMI device requires the EDID information, please use EDID Reader/Writer to retrieve and provide DVI or HDMI EDID information.
4. All HDMI over CAT5 transmission distances are measured using Belden CAT5e 125MHz UTP cable and ASTRODESIGN Video Signal Generator VG-859C.
5. The transmission length is largely affected by the type of Cat-5/5e/6 cables, the type of HDMI sources, and the type of HDMI display. The testing result shows solid UTP cables (usually in the form of 1000ft bulk cables) can transmit a lot longer signals than stranded UTP cables (usually in the form of fixed length patch cords). Shielded STP cables are better suited than unshielded UTP cables. A solid UTP Cat-5e cable shows longer transmission range than stranded STP Cat-6 cable. For long extension applications, solid UTP/STP cables are the only viable choice.
6. EIA/TIA-568-B termination (T568B) for category cables is recommended for better performance.
7. To reduce the interference among the unshielded twisted pairs of wires in UTP cable, one can use shielded STP cables to improve EMI problems, which is worse in long transmission.
8. Because the quality of the Cat-5/5e/6 cables has the major effect on how long the transmission limit can achieve and how good is the received picture quality, the actual transmission range is subject to one's choice of Cat-5/5e/6 cables. For desired resolutions greater than 1080i or 1280x1024, a Cat-6 cable is recommended.
9. If your HDMI display has multiple HDMI inputs, it is found that the first HDMI input [HDMI input #1] generally can produce better transmission performance among all HDMI inputs.

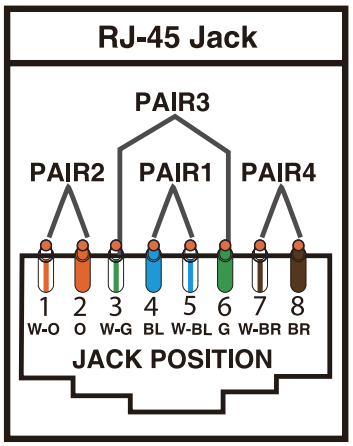
Performance Guide for HDMI over CAT5/6 Cable Transmission

Performance rating		**Type of CAT5/6 cable**		
Wiring	**Shielding**	**CAT5**	**CAT5e**	**CAT6**
Solid	Unshielded (UTP)	★★★	★★★★	★★★★★
	Shielded (STP)	★★★	★★★	★★★★
Stranded	Unshielded (UTP)	★	★★	★★
	Shielded (STP)	★	★	★★
Termination		Please use **EIA/TIA-568-B** termination (**T568B**) at any time		

RJ-45 DIAGRAMS

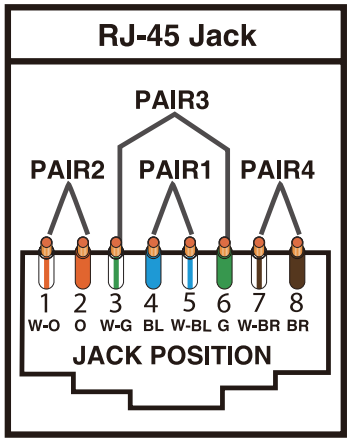
Audio/Video Signal Port

Data Link TIA/EIA-568-B		
PIN	Color	Function
1	W-O	TX0-
2	O	TX0+
3	W-G	TX1-
4	BL	TX2-
5	W-BL	TX2+
6	G	TX1+
7	W-BR	TXC-
8	BR	TXC+



Control Channel Port

Data Link TIA/EIA-568-B		
PIN	Color	Function
1	W-O	Hot Plug Detect
2	O	CEC
3	W-G	DDC SCL
4	BL	DDC SDA
5	W-BL	GND
6	G	GND
7	W-BR	Power
8	BR	IR



Do You Need Technical Support?

ZuumMedia is proud to offer free technical support to ensure your product is operating correctly.

If you are experiencing difficulties setting up this product, please call us for assistance 1-888-861-7351 or visit www.zuummedia.com for more information.

Here for You 24/7

8805 Jones Rd. Ste C104, Houston Texas 77065 *1-888-861-7351* www.zuummedia.com